UNIVERSIDAD DE LAS FUERZAS ARMADAS – ESPE

DEPARTAMENTO DE CIENCIAS DE LA COMPUTACIÓN

INGENIERÍA EN SOFTWARE

TEMA:

"DESARROLLO DE UN APLICATIVO MÓVIL QUE CONTRIBUYA A LA DETECCIÓN DE ENFERMEDADES EN EL FRUTO DEL CACAO CCN-51 A TRAVÉS DE LA EXPERIMENTACIÓN DE REDES NEURONALES CONVOLUCIONALES, EN LA FINCA BASANTE - JIMÉNEZ, UBICADA EN LA CIUDAD DE VENTANAS, PROVINCIA DE LOS RÍOS, ECUADOR."

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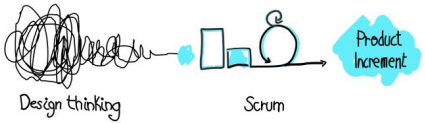
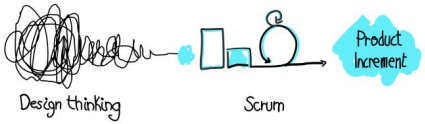
Morocho Basante, Jerson Alexander

DIRECTOR;

Ing. Navas Moya, Milton Patricio

SUMMARY





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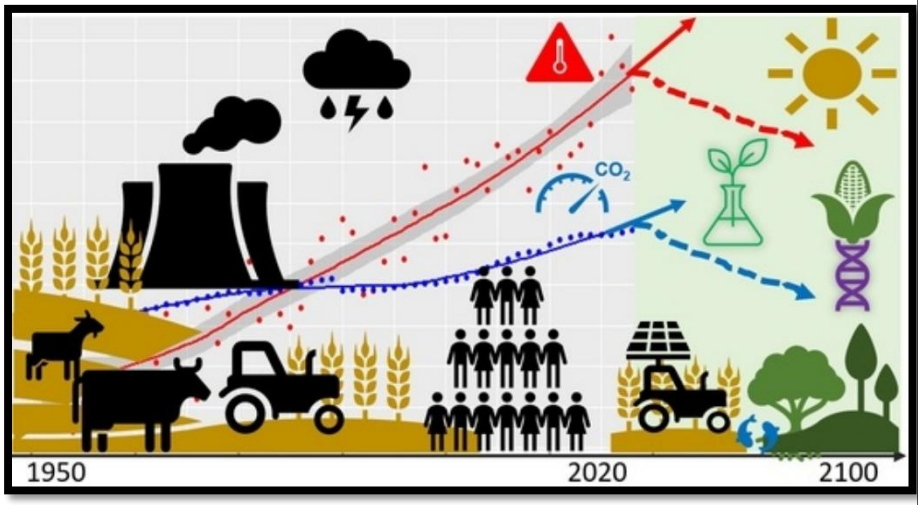
Introduction

Despite the enormous effort made by the world to reduce plant loss and food security, several references confirm that more than 20% of crop losses in the global scenario are due to plant diseases.

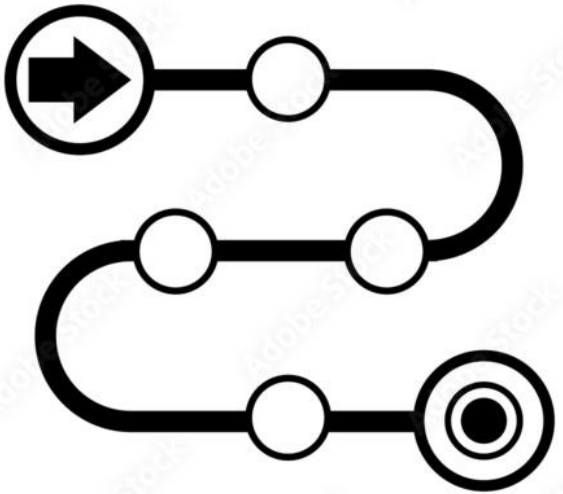
Impact of pollution and climate change



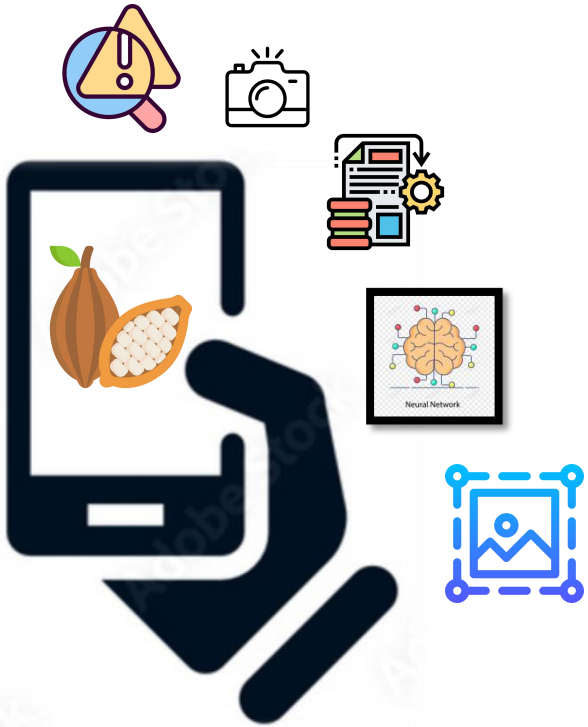
With the recent development of various agricultural technologies

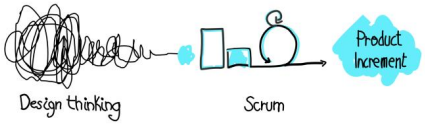
Farmers opt for plant disease databases or consult local pathologists via telephones

Proposal



Detect potential threats to cocoa by taking a photograph that will be processed and issued with an analysis of the fruit, based on the similarity in detecting quality in other fruits.





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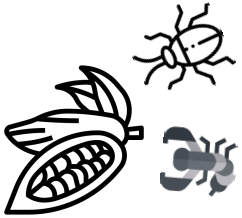
BACKGROUND

Importance of Cocoa in Ecuador

Cocoa CCN-51. A *cocoa variety originating in* Ecuador, *obtained in the* 1960*s by producer* Homero Castro Zurita, *in the canton of* Naranjal, Guayas *province.*

Cocoa Pests



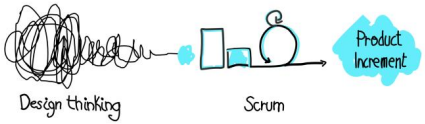
- **Cocoa fly.** *Caused by the* Monalonion *dissimulatum bug.*
- **Bull's horn.** *Caused by the sucking insect* Hoplophorion pertusa.

BACKGROUND

Cocoa Diseases

Moniliasis. *Caused by the fungus* Moniliophthera roreri. *As the infection progresses, a spot with white cottony tissue appears, this tissue turns grey due to theappearance of spores or seeds, ending with the mummification and deformation of the fruit.*

Witches' broom. *Disease caused by the fungus* Crinipellis pernicosa, *it causes an abnormal sprouting at the level of both terminal and auxiliary buds.*



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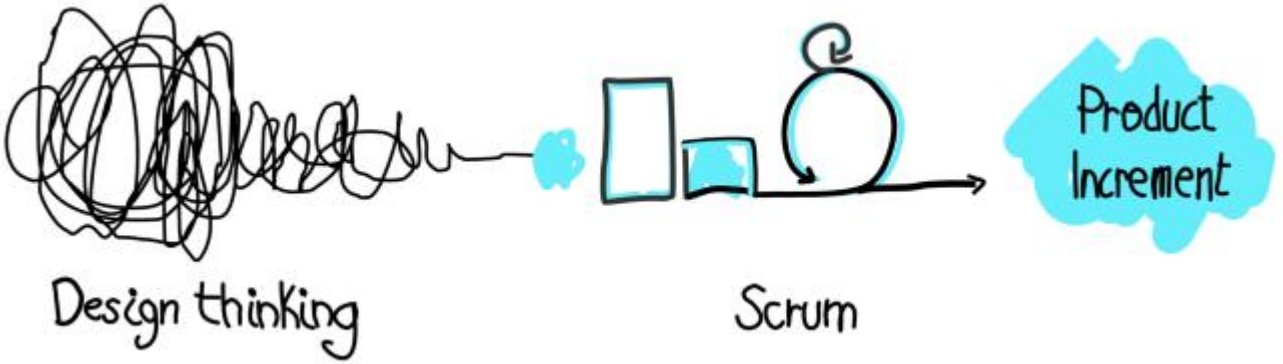
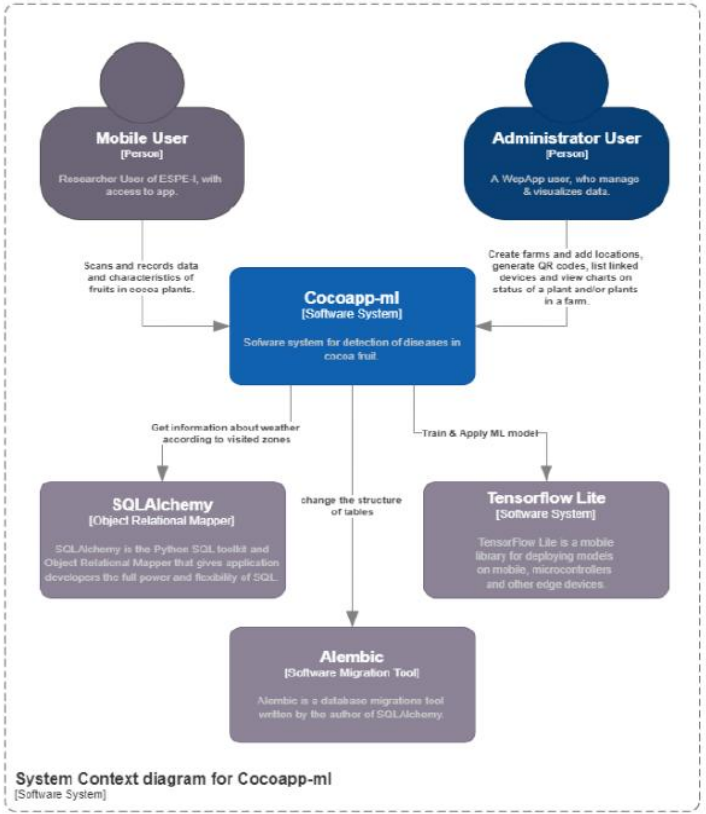
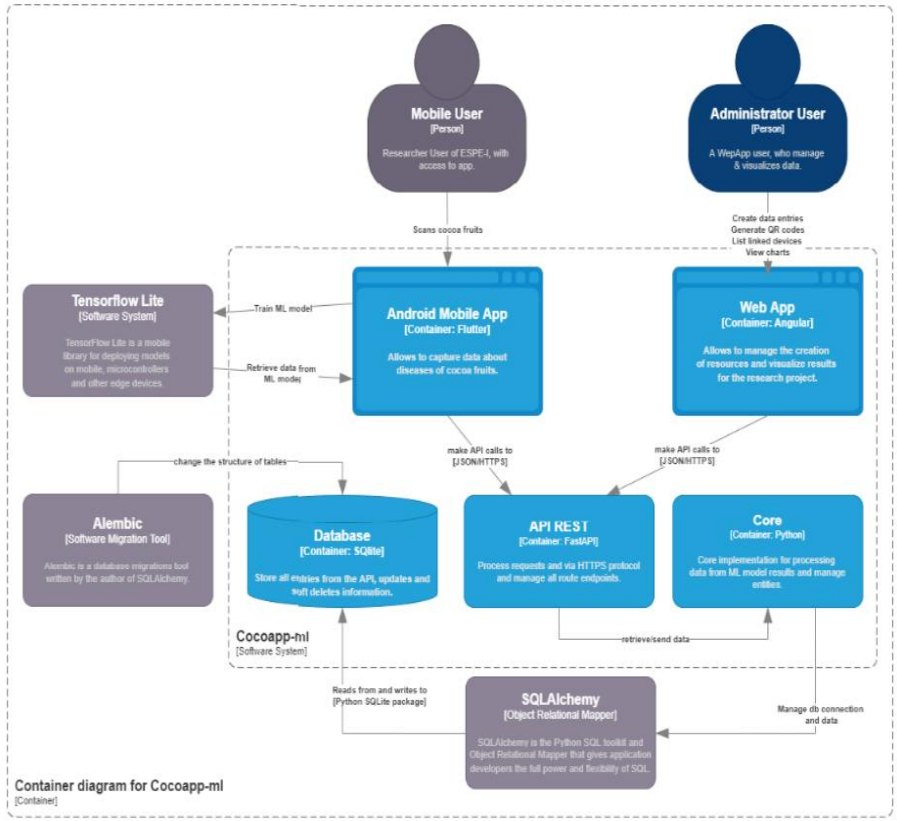
Methodology

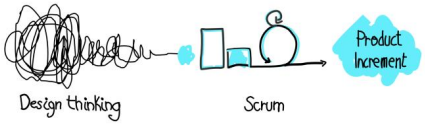


System Architecture

C4 Model







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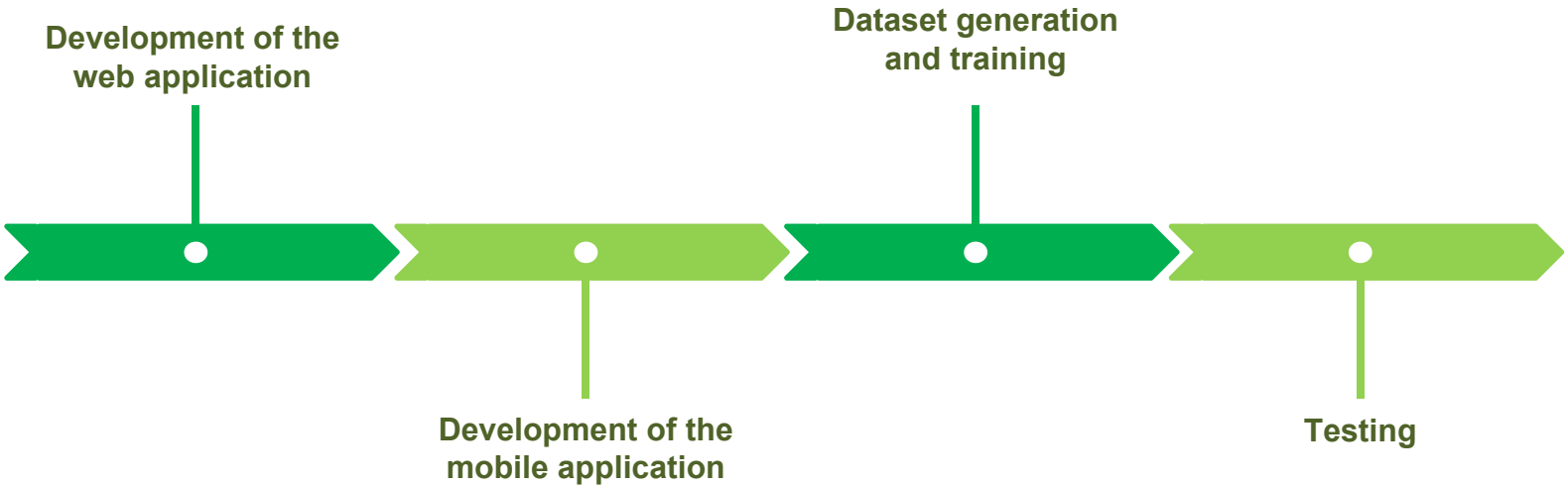
System Development



System Development

Development of the web application

Dataset generation and training

Development of the mobile application

Testing

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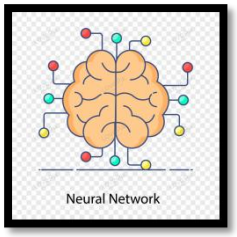
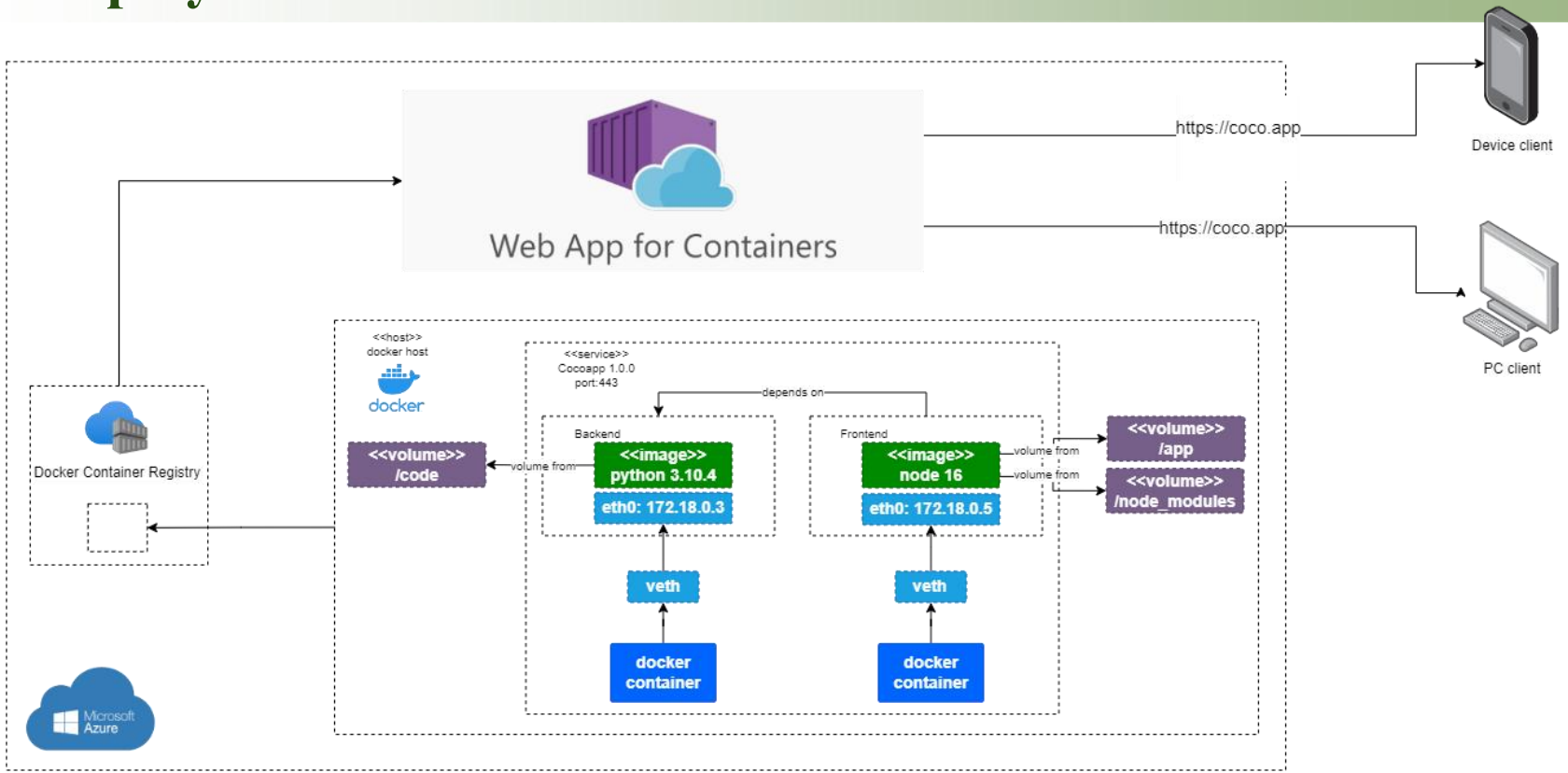


Deploy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Web App for Containers
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PC client
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Frontend
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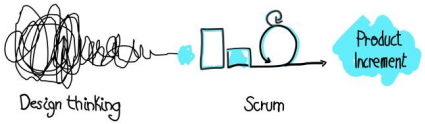
container
docker
container
Docker Container Registry
Microsoft
Azure



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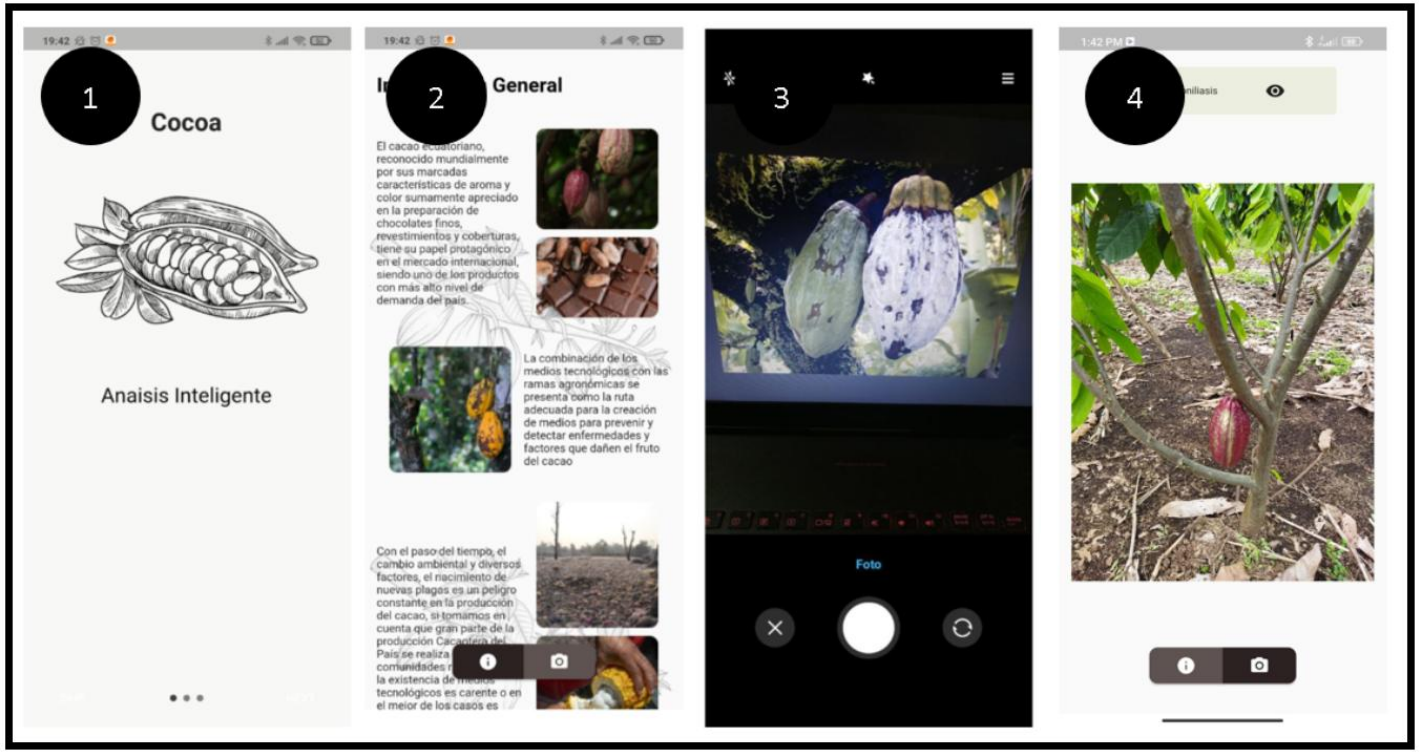
Interaction with the system



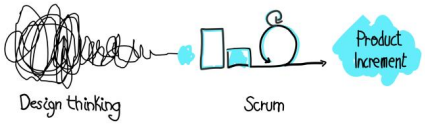
Interaction with the system

Validation

The application has a success rate of ***80 to 99.5%****. These results were obtained after subjecting the application to different environments and climate changes that could affect the quality of the photographs.*
In addition, a comparison was made between the traditional methods in the area and the application, obtaining the following results.

Comparison of traditional methods && System

	% Failure	% Hit
Traditional method	30 % - 50%	50%
Laboratory analysis	0.1% - 1%	99%
Application	0.4% - 20%	80 – 99%



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quick prevention eliminates part of the chemicals used for the cure of these pests

The long-term objective of this project is to extend this application to the whole area of the city of "Ventanas", located in the province of "Los Rios", Ecuador

THANKS